

535,286

Rec'd PCT/PTO 17 MAY 2005

(12) INTERNATIONAL PUBLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
3 June 2004 (03.06.2004)

PCT

(10) International Publication Number
WO 2004/047503 A1

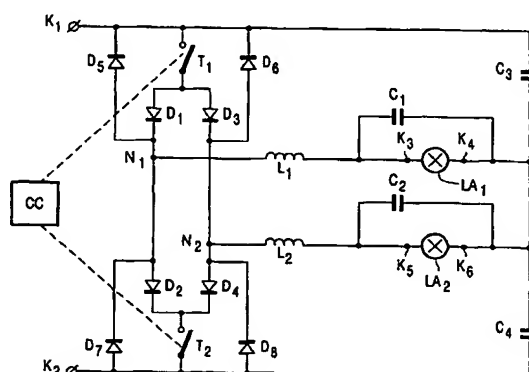
- (51) International Patent Classification⁷: **H05B 41/282**, 41/288
- (21) International Application Number:
PCT/IB2003/004828
- (22) International Filing Date: 28 October 2003 (28.10.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
02079853.4 21 November 2002 (21.11.2002) EP
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH,

[Continued on next page]

(54) Title: CIRCUIT ARRANGEMENT FOR OPERATING DISCHARGE LAMPS



(57) Abstract: A DC-AC converter in a half bridge configuration is used for operation with high pressure discharge lamps as well as low pressure discharge lamps. The converter consists in two switches (T1-T2) serially connected through a first series of diodes (D1, D2) and a second series of diodes (D3, D4) to which at their middle points (N1, N2) a first and a second lamp loads (L1, L2, LA1, LA2) are connected. Furthermore, the second terminals of the lamp loads are connected to the middle point of a series of capacitors (C3, C4) which are also connected to the terminals (K1, K2) of the supply voltage source. The converter includes also four diodes (D5, D6, D7, D8) which shunt the switches (T1, T2) and their respective series of diodes (D1, D2, D3, D4). The switches (T1, T2) are controlled by a controller (CC) which renders alternatively conductive at low frequency the two switches (T1, T2). In the first operating state, the first switch (T1) is rendered conductive and non-conductive at a high-frequency while the second switch (T2) is maintained in a non-conductive state, in the second operating state the second switch (T2) is rendered conductive and non-conductive at high-frequency while the first switch (T1) is maintained in a non-conductive state. The series of two capacitors (C3, C4) can be replaced by a series of two switches (T3, T4) in order to obtain a full bridge configuration of the converter. The particular configuration of the network and its operating mode allow to drive the lamp loads in such a way that the difference in power consumed by the lamps is comparatively small.

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PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

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Published:

— with international search report

INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/ 3/04828

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H05B41/282 H05B41/288

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 384 544 B1 (GREENWOOD SIMON RICHARD ET AL) 7 May 2002 (2002-05-07)	1, 2, 4-6
Y	column 2, line 33 -column 6, line 30; figure 5	3
Y	US 6 414 448 B1 (DURKAN THOMAS ET AL) 2 July 2002 (2002-07-02)	3
	column 5, line 29 -column 5, line 55; figure 5	
A	US 2002/047609 A1 (WENG DA FENG) 25 April 2002 (2002-04-25)	1-6
	page 2, paragraph 28 -page 4, paragraph 38; figures 9,12	
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☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

2 February 2004

Date of mailing of the international search report

16/02/2004

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3/04828

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 969 484 A (ZHANG ZHE ET AL) 19 October 1999 (1999-10-19) column 4, line 45 -column 4, line 59; figure 3B column 8, line 61 -column 9, line 15; figure 12 -----	1-6
A	US 6 236 168 B1 (MOISIN MIHAIL S) 22 May 2001 (2001-05-22) column 8, line 59 -column 9, line 15; figure 10 -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP03/04828

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6384544	B1	07-05-2002	US 6495971 B1 EP 0984670 A2 GB 2338358 A , B US 6188183 B1	17-12-2002 08-03-2000 15-12-1999 13-02-2001
US 6414448	B1	02-07-2002	AT 222043 T AU 735261 B2 AU 8643498 A DE 69807118 D1 DE 69807118 T2 DK 1042942 T3 EP 1042942 A1 ES 2183400 T3 IE 980617 A1 WO 9905889 A1	15-08-2002 05-07-2001 16-02-1999 12-09-2002 08-05-2003 02-12-2002 11-10-2000 16-03-2003 27-01-1999 04-02-1999
US 2002047609	A1	25-04-2002	CA 2255512 A1 JP 11265796 A	12-06-1999 28-09-1999
US 5969484	A	19-10-1999	NONE	
US 6236168	B1	22-05-2001	US 6069455 A AU 3482699 A CA 2328860 A1 WO 9953731 A1	30-05-2000 01-11-1999 21-10-1999 21-10-1999